French-German Summer School
Galois Theory and Number Theory
Konstanz, July 18-24 2015

On the Malle Conjecture and the Self-Twisted Cover

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Abstract: The Malle conjecture predicts that the number of Galois extensions of $\mathbb{Q}$ of given group G and with discriminant bounded from above by a real number $y > 0$ grows at least like y^a, for some specific exponent $a > 0$. This is known for nilpotent groups and for a few other groups. I will present a method that proves it for S_n, A_n, many simple groups, and more generally for all regular Galois groups over $\mathbb{Q}$. The constructed Galois extensions can further be prescribed some notable local conditions. The method uses a new version of Hilberts irreducibility theorem that counts the specialized extensions and not just the specialization points. An important ingredient is the self-twisted cover that we will introduce.